

Amendments to the Claims

Claims 1 and 2 are pending. Claim 1 is being amended. The following listing of claims replaces all previous versions of the claims in the application.

Listing of Claims

1. (currently amended) Optical amplifier equipment that amplifies optical data signals in a fiber-optic communications link that has at least one span of transmission fiber for carrying the optical data signals, comprising:

an input fiber;

an output fiber;

a Raman pump that produces Raman pump light at first and second wavelengths to create Raman gain for the optical data signals in the span of transmission fiber, wherein the first wavelength is different than the second wavelength, wherein the Raman pump light at the first wavelength creates Raman gain for the Raman pump light at the second wavelength;

a circulator that receives the Raman pump light at the first and second wavelengths from the Raman pump;

a first wavelength-division-multiplexing coupler connected to the input fiber, the output fiber, and the circulator, wherein the Raman pump light passes from the Raman pump through the circulator, through the first wavelength-

division-multiplexing coupler, and through the input fiber into the span of transmission fiber, wherein backscattered Raman pump light at the first and second wavelengths passes from the transmission fiber through the input fiber and through the first wavelength-division-multiplexing coupler into the circulator, and wherein the optical data signals pass from the transmission fiber through the input fiber, through the first wavelength-division-multiplexing coupler, and through the output fiber;

an optical monitor that measures the backscattered Raman pump light from the span of transmission fiber at the second wavelength;

a second wavelength-division-multiplexing coupler connected to the circulator that separates the backscattered Raman pump light at the first wavelength from the backscattered Raman pump light at the second wavelength, wherein the second wavelength-division-multiplexing coupler is connected to the optical monitor and wherein the backscattered Raman pump light from the span of transmission fiber at the second wavelength passes through the input fiber, through the first wavelength-division-multiplexing coupler, through the circulator, and through the second wavelength division multiplexing coupler into the optical monitor; and

a control unit that uses the Raman pump and the optical monitor to perform optical time domain reflectometry

measurements on the transmission fiber using a pump and probe arrangement in which the Raman pump light at the second wavelength is pulsed to perform optical time domain reflectometry measurements while the Raman pump light at the first wavelength is modulated to measure the effects of adjusting the Raman gain produced by the Raman pump light at the first wavelength in the span of transmission fiber, wherein the Raman pump light at the first wavelength is modulated at a first frequency without reducing its power to zero, wherein the Raman pump light at the second wavelength is pulsed at a second frequency without reducing its power to zero, and wherein the second frequency is greater than the first frequency.

2. (original) The optical amplifier equipment defined in claim 1 wherein the Raman pump comprises a plurality of laser diodes operating at different pump wavelengths.